DESCRIPTION

Invention title.-

~~INTERNAL DEVICE PROJECTOR OF IMAGES ON POLYHEDRONS WITH POLARIZABLE GLASS FACES AND PROJECTION PROCEDURE~~

A SYSTEM FOR PROJECTING IMAGES ON INSCRIBED POLYHEDRONS HAVING POLARIZABLE FACES AND A PROJECTION PROCEDURE (1)

Background to the previous technical situation.-

It is unknown so far as ~~in the~~ background is concerned about ~~to~~ the previous technical situation of (2) a device with an image (3) projector ~~of images~~ situated within the smaller polyhedron ~~in the inner part of the smaller polyhedron~~ (4) of two or more inscribed (5) hollow polyhedrons, each one being ~~which are~~ contained within ~~one~~ another larger one (6) but not being ~~inscribed but not~~ (7) encapsulated with contact faces, since it is essential that there is enough distance between their faces so that an external spectator could appreciate the three-dimensional or space effect that is proposed.

~~and being the~~ (8) The smaller polyhedron (9) ~~one~~ is contained in the bigger one (10) that circumscribes it and this one successively ~~in~~ within (11) the next, all of them could be either concentric, in which ~~that~~ (12) case they would have the same centre, or could be leaned (13) on the ~~a~~ (14) same base or each one could have a different base at ~~in~~ (15) different levels.

The polyhedrons consist essentially ~~characterised by being fitted each one with~~ of (16) faces of translucent glass polarizable to transparent making it possible to project images in a successive way on every polyhedron, only (17) the inner one or any of the outer ones when the glass polarization is activated since on becoming transparent it modifies (18) ~~allows to modify~~ the glass screen where the image is projected by retro projection

with a three-dimensional effect and with a demonstrative, advertising or exhibition purpose.

Disclosure of the invention.-

The proposed invention is a retro projection procedure and an appropriate device for its working, based on the retro projection of images on concentric or successive screens which are activated successively in order to fix the projected image ~~of the projector on~~ onto every screen. **(19)**

~~since the~~ The screens consist of two sheets of glass or another transparent material with a liquid between both sheets which is liable to conversion to transparent or translucent states **(20)** by electrical polarization or depolarisation, so that the image stops being reflected **(21)** ~~reflecting~~ on the screen when it is transparent and on the contrary the image is reflected on the one that is in translucent state.

~~, producing~~ **(22)** This produces the effect of moving the space plane where the image ~~it~~ is formed, approaching or moving away ~~off~~ **(23)** from the spectator and increasing or decreasing its size.

As a result the procedure is a system of ~~images~~ retro projection images **(24)** associated to the next technical characteristics:

1°.- The source of images will be placed inside the inner polyhedron of two or more hollow ones preferably regular with the same shape although irregular or ~~with a~~ different shaped **(25)** polyhedrons could be used if they are provided with lenses **(26)**, mirrors or auxiliary projectors ~~of~~ for **(27)** redirection of images situated ~~in those~~ on the **(28)** faces of each polyhedron that ~~are~~ is **(29)** not used as a screen ~~in order to~~ so that **(30)** the auxiliary means are made invisible to the spectator.

2°.- The polyhedrons will be disposed in a way that each one is interior or inscribed in respect ~~of~~ to **(31)** the next one that circumscribes it with separation between ~~its~~

faces so that ~~each~~ all (32) polyhedron faces used as screens are parallel ~~total~~ and totally (33) or partially inscribed inside the luminic angle of projection of the images, though in certain cases the inscribed polyhedrons could be conjugated or have their faces in angle ~~in respect of~~ with respect to (34) those of the circumscribed polyhedron in which case they will have to be associated to a complex system of lenses, mirrors or other optical means which redirect by reflection the images to the next polyhedron or have auxiliary independent projectors.

~~since~~ (35) The essential content of the new invention is the visual effect that is caused to the spectator by a multiscreen device in which each screen inscribed inside another bigger one or circumscribed to another smaller one could become transparent or translucent by modifying the special location of the same image in a three-dimensional system. As far as the present description is concerned, an inscribed polyhedron is defined as the one, which is contained ~~in~~ within (36) another bigger one that circumscribes it, similarly to what is said about a polygon inscribed inside a circumscribed polygon.

3°.- The polyhedron faces will be made of a special crystal, in glass, methacrylate or any other substance, characterised by being translucent under ordinary conditions, operating in this case to an external observer as a screen to retro project the images projected onto it emitted from the inner part of the polyhedrons.

~~or becoming~~ Alternatively it becomes (37) transparent by polarization or another method when a light electrical current ~~pass~~ is passed (38) through it. In such a case the images that appear from the ~~device projector of images~~ image projector device (39) will pass through the transparent glass freely and they will ~~project on~~ be projected onto (40) the next polyhedron faces that are translucent, directly or by reflection of the image by means of lenses or auxiliary mirrors.

They could also be emitted onto the circumscribed polyhedron by means of independent auxiliary projectors.

~~being~~ It is essential that ~~they~~ images **(41)** are seen by an outside observer by retro projection ~~in~~ onto **(42)** one or another screen ~~being~~ which is **(43)** contained ~~each one in the bigger one~~ within another larger one **(44)** , and that the screen where the images are projected could be modified at the choice of an operator or the spectator himself.

4°.- With a device of dynamic effect which modifies the polyhedron's translucent or transparent state by activating or deactivating the glass polarization respectively **(45)** like a computer or another system that regulates the electrical current of polarization of each polyhedron screen ~~glasses~~, **(46)** it will be possible to project images from the inside of them, successively onto any of the faces of every polyhedron, depending on whether they are polarized or not, and thus each polyhedron could act in an independent way in a three-dimensional multiscreen system.

5°.- An auxiliary system of lenses, mirrors or auxiliary independent projectors will have to make sure that the same image emitted by a projector or from an internal bunch of projectors is appropriately directed for its projection or it is projected from an auxiliary projector on ~~each~~ all **(47)** polyhedron faces.

6°.- The internal image projector in every case will remain concealed to the spectator because there will always be between the spectator and the projector an activated screen with images projected on it ~~that~~ which **(48)** will prevent the projector from being seen. This one could be concealed as the case may require in order to make it disappear from the inner polyhedron in which it **(49)** is contained to make it invisible supposing that the operator polarizes the faces of all the polyhedrons making them totally transparent.

7°.- The lenses or auxiliary mirrors of redirection of images and as the case may be the independent auxiliary projectors, will be installed in one of the polyhedrons faces that is not used as a screen, so they stay concealed to the spectator's sight on those polyhedron faces that operate as screens.

The new invented device is a projector located in the inner polyhedron of two or more polyhedral bodies ~~inscribed each one in the~~ each one being inscribed in a **(50)** bigger one that contains it, concentric or conjugated **(51)**, ~~provided with~~ preferably consisting of parallel faces which are separated ~~between them~~ from each other **(52)** and inscribed into the emitter angle of light projection.

The polyhedron faces are **(53)** made of translucent polarizable crystal, either glass, methacrylate or any other material, and provided with a system of lenses or multidirectional mirrors in order to allow the projection of the same image onto **(54)** all the faces of every glass polyhedron from the inside.

~~so that~~ **(55)** Glass polarization and depolarisation allow the image to be seen in any of the glass polyhedrons by modifying its three-dimensional location in space simultaneously in all the polyhedron faces or in those selected as screens.

~~without~~ **(56)** The image projector is not accessible to the eye of the spectator since it is located inside and because an activated screen always exists between the spectator and the projector or as the case may require by concealing the projector in order to make it disappear if all screens are polarized and made transparent. In that way a new device of projection with luminic, three-dimensional and dynamic effects, ~~able of holding~~ able to hold **(57)** spectator attention at a high degree with an advertising, didactic or entertainment purpose is obtained.

Instructions as to the best way of bringing the invention into effect.-

~~It is proposed as to~~ For the best way of bringing the invention into effect the construction of two hollow concentric cubes is proposed, **(58)** with side faces of glass or multilaminar methacrylate ~~provided within its sheets with~~ between the sheets of which there is **(59)** a liquid .

This liquid is **(60)** polarizable under the action of a low-intensity current that causes its transparency effect by polarization as the one used in any of the notorious patents or trademarks on the market in order to activate the transparency of translucent glass screens.

In the geometrical centre of these polyhedrons the system is provided with a projector or a bunch of image projectors which by means of a set of lenses or mirrors reflects the same image on every face of the polyhedron where it is contained.

~~being able of making it indifferently in~~ The projector is able to project the image on the **(61)** inner polyhedron if its glass faces are translucent in order to allow that the ~~screen effect of the~~ image is produced ~~in~~ on **(62)** them.

Or equally **(63)** in the case that the faces of that inner polyhedron are polarized and made transparent, the image ~~they~~ **(64)** could be projected **(65)** on those of the outer polyhedron or on the following one that will have been depolarised and transformed to a translucent state with the same purpose, provided that the faces of the polyhedron placed in the middle as the case may be are in a transparent state. In this way the same image could be seen ~~in~~ on **(66)** every face of each polyhedron, not only on the outer one but also on any of the inner ones.

~~and so~~ Thus **(67)** its projection could be alternated dynamically in each polyhedron with the effect of the modification of the three-dimensional location of the images projected on all the faces of each ~~one~~ polyhedron, **(68)** without the projector contained

in the centre ~~is~~ being **(69)** visible, in order to hold intensely and ~~with~~ in **(70)** a new way spectator attention with a didactic, advertising or entertainment aim.

The association of the device to a system of sensors (either of a luminic, acoustic or thermal nature) or as the case may require to a computer, ~~allows that~~ activates **(71)** a programmed sequence of projections by response to a stimulus such **(72)** as the mere presence of an spectator or any other stimulus that activates the sensors. ~~is activated~~. **(73)**

Technical field.-

The described invention has an industrial application as a projector with a didactic, advertising or entertainment aim.

Drawings.- (74)

The figure 1 is a set of two concentric cubes . The inner projector (1) is located in the centre of the smaller polyhedron. The screen (2) that is nearer the projector permits to form the emitted image if it is in a translucent state or to pass the image through it onto the outside screen (3) if (2) is in transparent state.

The figure 2 is a set of three conjugated cubes and it requires the use of lenses or mirrors to redirect the emitted image to the next screen.

CLAIMS (75)

1.-A system for projecting images on inscribed polyhedrons having polarizable faces, comprising:

-an inner rear projector or bunch of projectors for projecting images such as pictures or movies;

-a polyhedron structure comprising two or more inscribed polyhedron bodies, concentric or not, the inner rear projector or bunch of projectors being located in the most inner polyhedron; wherein,

-the faces of each polyhedron body being screens formed by two sheets of glass, methacrylate or any other multilaminar material with the liquid between them polarizable by an electrical current for making the screen to become transparent when electrical current is applied and become translucent when the current stops,

-a transparent screen lets an image or a portion of image pass through it toward the next screen or outside the polyhedron structure and a translucent screen forms the image or a portion of image,

-an image or a portion of an image can be formed on one or another corresponding screen so as to modify the three-dimensional location in the space of an image or a portion of image;

-an spectator is allowed to see an image or a portion of an image on one or another of the corresponding screens of the polyhedron bodies without seeing the inner rear projector or bunch of projectors since a translucent screen is always between the spectator and said inner rear projector or bunch of projectors or all the screens become translucent;

-the system is able of obtaining luminic, three-dimensional and dynamic effects for holding the spectator attention at high- degree with an advertising, didactic or entertainment aim.

2.- The system according to Claim 1 wherein the inner rear projector or bunch of projectors is associated with a system of multidirectional lens or mirrors or independent auxiliary projectors in the case in which the faces of the polyhedron bodies are not parallel or the polyhedron bodies are conjugated or irregular.

3.- The system according to Claim 1 wherein the transparent or translucent state of a screen is activated into a sequence by means of a system of luminic, acoustic or thermal sensors which reacts to a stimulus or external agent, associated or not to a computer able to programme the polarization of each screen by means of an electrical current and to select the images to emit by the inner rear projector or bunch of projectors.

4.- A projection procedure utilizing a system for projecting images on inscribed polyhedrons having polarizable faces, comprising:

-an inner rear projector or bunch of projectors for projecting images such as pictures or movies;

-a polyhedron structure comprising two or more inscribed polyhedron bodies, concentric or not, the inner rear projector or bunch of projectors being located in the most inner polyhedron; wherein,

-the faces of each polyhedron body being screens formed by two sheets of glass, methacrylate or any other multilaminar material with the liquid between them polarizable by an electrical current for making the screen to become transparent when electrical current is applied and become translucent when the current stops,

-a transparent screen lets an image or a portion of image pass through it toward the next screen or outside the polyhedron structure and a translucent screen forms the image or a portion of image,

-an image or a portion of an image can be formed on one or another corresponding screen so as to modify the tri-dimensional location in the space of an image or a portion of image;

-an spectator is allowed to see an image or a portion of an image on one or another of the corresponding screens of the polyhedron bodies without seeing the inner rear projector or bunch of projectors since a translucent screen is always between the spectator and said inner rear projector or bunch of projectors or all the screens become translucent;

the procedure comprising the step of:

selectively polarize or depolarize by electrical current the liquid between the two sheets of a screen so as to cause the screen to become transparent or translucent in order to project an image or a portion of image, so as to obtain luminic, tri-dimensional and dynamic effects for holding the spectator attention at high-degree with an advertising, didactic or entertainment aim.

ABSTRACT (76)

A SYSTEM FOR PROJECTING IMAGES ON INSCRIBED POLYHEDRONS HAVING POLARIZABLE FACES AND PROJECTION PROCEDURE, the system consisting of two or more inscribed polyhedrons whose faces are of translucent glass polarizable by electrical current that transforms them to transparent, with an apparatus image projector within the smaller polyhedron and a system of lenses or mirrors that directs the emitted image from thee inside to all the polyhedron faces, the image being formed by retro projection onto the translucent faces and stops being projected onto them when they become transparent, being projected onto the next translucent polyhedron and a image projection procedure from the inside onto the polarizable glass faces of a succession of polyhedrons contained within each other that operate as a screen when they are translucent and permit the image to be projected onto the next translucent polyhedron when they become transparent.

NOTES FOR THE EXAMINER

(1) Replacement. A new title is proposed according to Detailed Action n° 3. The new title is the same accepted by the European Patent Office.

(2) to (12). Replacement. Amendments of style to improve and make clearer the text without technical characterizing effect .

(13) Addition. "Leaned" clarifies the text meaning.

(14) and (15). Replacement. Grammar improvement.

(16) Addition. Improvement of the text according to the Detailed Action n° 5.b.

(17) Addition. Improvement of style.

(18) and (19). Replacement. Grammar improvement. New paragraph.

(20) Addition. " States" clarifies the text meaning.

(21) and (23). Replacement. Grammar improvement.

(22) Replacement. New paragraph to make clearer the text.

(24) and (25). Replacement. Grammar improvement.

(26) Replacement. "Lenses" by " lens" with the same meaning. Grammar correction.

(27) to (34) and (36). Replacement. Grammar improvement.

(35) and (37) Replacement. New paragraph to make clearer the text.

(38) to (40). Replacement. Grammar improvements.

(41) Replacement. New paragraph and grammar improvement of the sentence.

(42) to (44). Replacement. Grammar improvement.

(45) Addition. Improvement of style.

(46) Replacement. Improvement of the sentence meaning.

(47) and (48). Replacement. Grammar improvement.

(49) Addition. Grammar improvement.

(50) Replacement. Grammar improvement.

(51) Addition to make clearer the text.

(52) Replacement. Improvement of style.

(53) Replacement and addition. New paragraph and grammar improvement.

(54) Replacement. Grammar improvement.

(55) and (56) Replacement. New paragraph.

(57) to (59) Replacement. Grammar improvement.

(60) Replacement and addition. New paragraph and grammar improvement.

(61) Replacement. New paragraph and change of style to clarify the text.

(62) Deletion and replacement. Simplification of the text with the same meaning and grammar improvement.

(63) Replacement and addition. New paragraph and improvement of style.

(64) to (66) Replacement. Grammar improvement.

(67) Replacement. New paragraph and improvement of style.

(68) , (69) and (70) Replacement. Grammar improvement.

(71) and (73) . Replacement and deletion to make clearer the text.

(72). Addition. Grammar improvement.

(74) Addition. Description of the drawings requested by the Detailed Action n° 1.

(75) Replacement of all the text of the claims according the Detailed Action n° 5 and 7. The new text of the claims has been agreed with the Patent Examiner of the European Patent Organization to improve the PCT application.

(76) Replacement. A new abstract is submitted in accordance with the new title and the specifications.